BEETLE PHOTOGRAPHY.

BY H. C. HOVEY.

Certain beetles have a peculiar apparatus, enabling them to execute remarkable somersets when laid upon their backs, whence they get their common name of spring beetles or snapping bugs. Their generic name of *Elater*, from the same root as the word *elastic*, is suggested by this power of leaping into the air and alighting again on their feet. This feat is accomplished by having the prosternum elongated into a spine, which fits into a cavity of the mesosternum. The insect, lying on its back, first bends itself upward so that it rests on its head and the tip of its abdomen. It then unbends itself suddenly, the spine enters the hollow described, and thus the back strikes the floor with force enough to throw the creature ten or twenty times its own length into the air. This maneuver is repeated until it finds itself on its feet.

Several species of the *Elateridæ* are luminous in the dark. The common firefly, or lightning bug, of the United States is too well known to need a special description. But its powers are feeble compared with the so-called "lantern flies," or "cucuyos," found in Cuba, Brazil, and Mexico. M. Michelet records the most extraordinary stories of these natural lamps hung on the trees in the dark southern forests. He says that a Spanish battalion, about to disembark, were deterred from doing so, mistaking the cucuyos for matches which they supposed native soldiers were ready to apply to their arquebuses. He also tells us that persons traveling by night are accustomed to pick these fire beetles from the bushes, and fix them on their boots, so as to show the pathway, and put to flight lurking serpents. In the morning the insects are carefully replaced on other bushes, so as to be at hand for the next lonely tourist that may need their aid. Mexican ladies are said to mount the cucuyos as gems in their hair, string them as living diamonds around their waists, or, imprisoning them in gauze bags, tastefully dispose of them amid their robes, where they blaze or pale according to the condition they may happen to be in.

A living specimen of the *Elater* (or *Pyrophorus*) *noctilucus* was recently presented to the Bridgeport Scientific Society, whose curator, Mr. F. C. Smith, has kindly given myself and others the opportunity to experiment with this interesting representative of the *Coleoptera*. It resembles closely the *E. oculatus*, which is the largest of our common snapping bugs. Its length is about one inch and a half, and its prevailing color is a dark brown. On each side of its thorax are oval spots, looking like eyes, which, however, they are not. In the dark these oval spots throw such a strong greenish light as to seem like a pair of tiny electric lamps in full glow. The cucuyo also emits light from between the segments of the abdomen. Placed on a watch dial, its light enables one to tell the time of night. It is sufficiently strong to illuminate a small printed page so that the words are clearly legible. Its radiance appears to be, to some degree, under control of the will. When a jet of gas is rapidly turned on and off, the insect does his best, whether from rivalry or some other cause.

Being desirous of seeing what might be done in the line of photography by this novel phosphorescence (or whatever this peculiar natural light may be), Mr. Smith suggested to Mr. L. Farini the possibility of taking pictures of small objects by this means. The experiments performed in the presence of the writer and other witnesses were surprisingly successful. Finally, at my request, and especially to illustrate this article, Mr. Farini made the accompanying copy of a family portrait. He used a Seed plate, sensitometer No. 24. The *Elater* was held in the fingers within one inch of the original to be copied, and in such a position as to allow the rays to fall perpendicularly on the negative. The time of exposure to bug light was thirty seconds. The subsequent development was by the usual process. Mr. Farini thinks it possible to photograph the fire beetle by its own light, but has not yet done so. What he has already accomplished, however, is certainly a great novelty in photographic art.

It may be added that, in its Cuban home, the *Elater* feeds on the sugar cane, and its larva does much mischief by devouring the roots of the various kinds of tropical plants. It seems to thrive in its northern captivity, eats the food provided for it with avidity, and takes kindly to the scientific experiments in which it is called to share.

BEETLE PHOTOGRAPHY.

CALMING THE SEA WITH OIL.

Admiral Cloue, who, as well known, has occupied himself with the question of calming waves with oil, has recently published upon this subject a most interesting study in which he has reproduced and rendered complete the curious observations already presented by him in a communication to the Academy of Sciences. The author in the first place recalls all the historic notices left by writers or transmitted by tradition among certain maritime populations, showing that the effect of pouring oil on water was well known to the ancients, but has been neglected in modern times through a forgetfulness that it is difficult to explain. We shall not dwell upon these citations; but, as the manner of spreading the oil on the sea presents a great importance from a practical point of view, we shall give by preference a few details as to the arrangements that have already been tried to this effect.

For sea-going vessels, says the Admiral, it seems up to the present that it is in sailing before the wind or standing ahull that the action of the oil is most certain. We have, adds he, seventy-four examples of ships sailing wind astern and seventy-two ships ahull that have succeeded in protecting themselves from the lashing of the sea with a minimum output considering the importance of the result obtained, say with an average of less than six quarts per hour.

Several ships, moreover, have been enabled to use the oil effectively with the waves and wind coming from the quarter, and two are even mentioned that have been able to continue their course with the wind and a rough sea athwart.

The most difficult case is that of a ship sailing head to the waves, and despite the astonishing rapidity with which the oil spreads over the sea, it seems that no success has been obtained in calming the breakers by this means, since the oil has not the time to get ahead of a ship under way. The sole exception that the Admiral is able to cite is that of the English steamer Concordia, which appears to have effectively employed oil for running ten knots against a heavy sea—an example to which was later added that of the German packet Main; but these are isolated, exceptional cases, so to speak, and there are interesting experiments to be made from this point of view, in order to assure a practical distribution of oil around a ship sailing head to the waves.

The reservoir most generally used for spreading the oil is a strong canvas bag of about five gallons capacity. This is filled with oakum saturated with oil, its mouth is tightly closed, and several holes are made in the side with a sail needle. When the wind is astern, one of these bags is often allowed to trail from each angle of the stern, or from a point a little further forward. Certain captains, however, says Admiral Cloue, prefer to attach the bags to the catheads. The bow of the ship, in plunging and repelling the sea, thus spreads the oil and widens the path where the breakers are suppressed. This arrangement appears to be very efficacious.

The bags used have various forms. They are generally cylindrical, with a basal diameter of eight inches for a length of twenty, but they are sometimes more elongated or have the form of a double cone, which facilitates the towage. In principle, it is well to endeavor to obtain a feeble but continuous and regular flow, owing to which the sheet of oil extends to a distance better than by an abundant and too sudden a flow. In addition to bags, it is possible to employ other and less primitive arrangements for spreading the oil, especially a piston apparatus. This latter has the advantage of operating solely through the pitching motion of the vessel. Its operation is certain, but it is somewhat delicate and discharges a little too much oil.

Fig. 2.—LIFE-BOAT WITH OIL BAG.

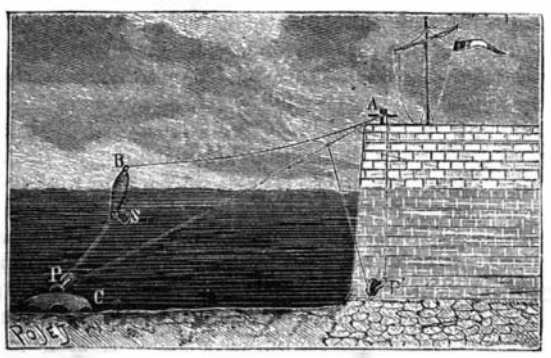

Fig. 3.—OIL BAG AT THE ENTRANCE OF A PORT.

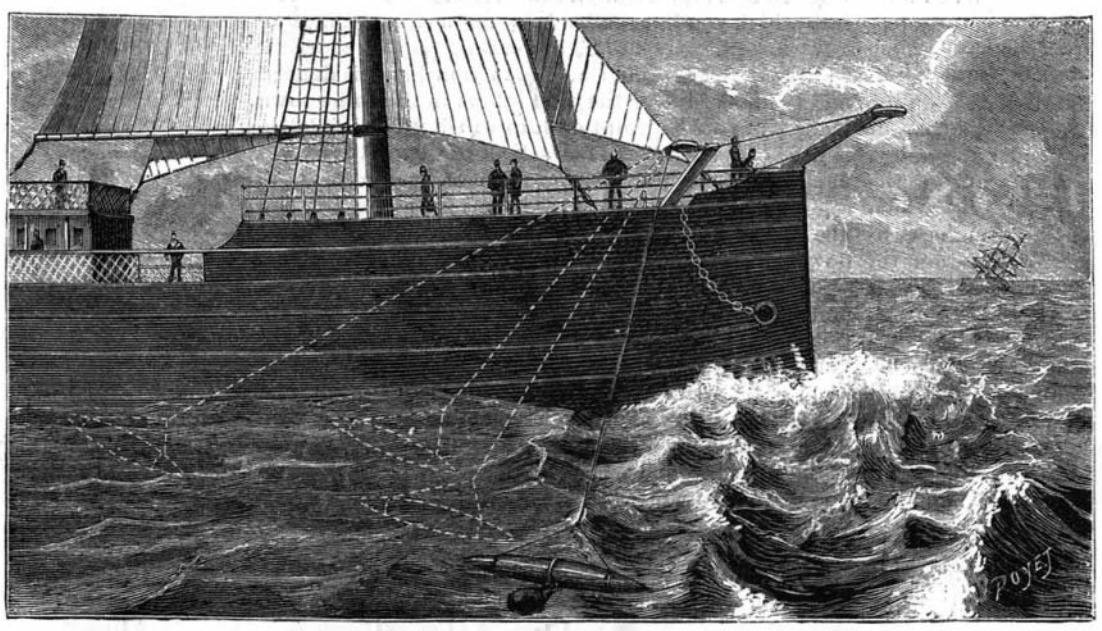

Fig. 1.—SHIP PROVIDED WITH A FLOAT CARRYING AN OIL BAG.

Mr. Townsend, who has recently made an interesting communication on this subject to the Franklin Institute of Philadelphia, proposes the use of a hollow metallic sphere, ten inches in diameter, partially full of oil, to be thrown into the sea with a rope. This sphere would be steadied by a compartment in the interior. The oil chamber would be provided with two valves, one beneath for the admission of water, and the other above for the outflow of the oil, which the water would gradually replace. These valves would permit of regulating the flow in advance, at the moment of throwing the sphere overboard.

In order to be thoroughly efficient, the apparatus must be capable of being placed at a certain distance off on the sea, and be so arranged that the outflow can be regulated for running with side or rear winds, especially if, as is usually the case, the ship has not a rounded bow. At present, a continuous layer of a certain width is thus spread around the ship, and the latter evolutes in it freely, but it is necessary, in addition, to have the possibility of regulating the outflow as